Lunar Volatiles Extraction Technology for Future Fusion Power and Multi-Outpost Scale Human Space Exploration

Completed Technology Project (2014 - 2018)

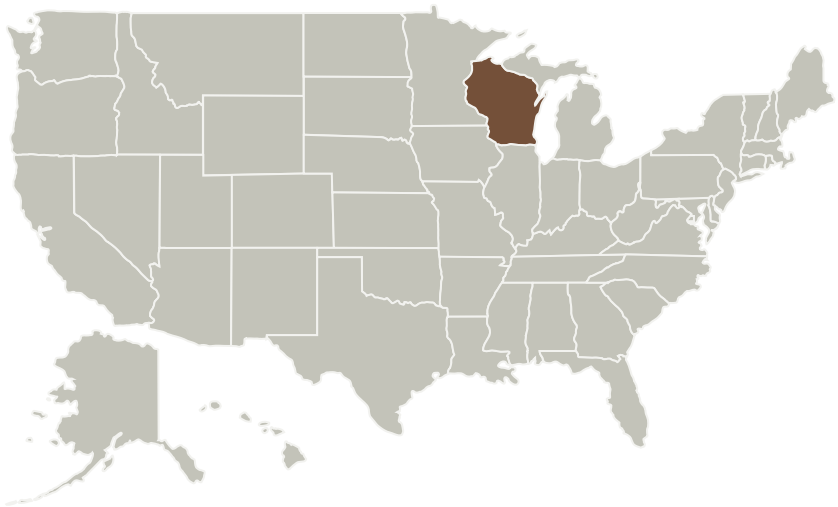
Project Introduction

The proposal is for the development of a prototype lunar volatiles extraction system the will demonstrate a process for acquiring helium-3 and volatile gases that can be used for life support. Helium-3 could be used in future fusion reactors that would produce no radioactive waste. The process of acquiring helium-3 produces far more life supporting volatile gases than helium-3, and incorporates many of the technologies that may be required in the future for supporting multiple in space outposts from lunar resources. The prototype system will be based on a past lunar volatiles miner design, developed at the University of Wisconsin Fusion Technology Institute, and will be a scaled down version that will investigate issues of system optimization for volatile production, component degradation due to continuous exposure to regolith simulant and thermal energy efficiency of the prototype's heat pipe heater system.

Anticipated Benefits

The process of acquiring helium-3 produces far more life supporting volatile gases than helium-3, and incorporates many of the technologies that may be required in the future for supporting multiple in space outposts from lunar resources.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
University of Wisconsin-Madison	Lead Organization	Academia	Madison, Wisconsin

Primary U.S. Work Locations
Wisconsin

Project Website:

https://www.nasa.gov/directorates/spacetech/home/index.html

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

University of Wisconsin-Madison

Responsible Program:

Space Technology Research Grants

Project Management

Program Director:

Claudia M Meyer

Program Manager:

Hung D Nguyen

Principal Investigator:

Gerald L Kulcinski

Co-Investigator:

Aaron D Olson

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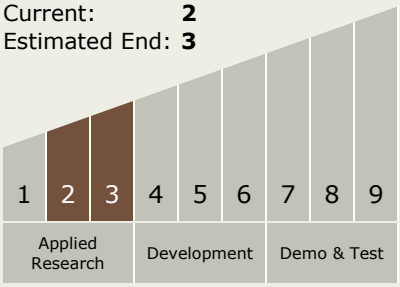
Completed Technology Project (2014 - 2018)

Technology Maturity (TRL)

Start: **2**
Current: **2**
Estimated End: **3**



Technology Areas

Primary:

- TX07 Exploration Destination Systems
  - TX07.1 In-Situ Resource Utilization
    - TX07.1.2 Resource Acquisition, Isolation, and Preparation

Target Destination

The Moon